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Published in:
Nordic and Baltic Journal of Information and Communications Technologies

DOI (link to publication from Publisher):
10.13052/nbjict1902-097X.2018.011

Publication date:
2018

Document Version
Publisher's PDF, also known as Version of record

Citation for published version (APA):
Falch, M., & Henten, A. (2018). Universal service in a digital world: The demise of postal services. *Nordic and Baltic Journal of Information and Communications Technologies*, *1*, 207-222.
https://doi.org/10.13052/nbjict1902-097X.2018.011

Universal Service in a Digital World: The Demise of Postal Services

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Received 25 October 2018;
Accepted 11 December 2018

Abstract

The paper is concerned with the demise of postal services in light of the development of digital information and communication services. To an increasing degree digital services substitute for postal letter services, while digital and postal services complement one another with respect to parcel services. Denmark is used as case country.

Keywords: Digitalization, postal services, substitution, Denmark, country comparison.

1 Introduction

This paper examines the impact of substitution of postal services with electronic communications and how this challenges the possibilities to maintain ubiquitous postal services with universal coverage. Denmark is used as an example, as this is one of the leading countries with regard to substitution of electronic communications for postal services.

Postal service is a public utility like telecom, electricity, railways etc., and the postal sector has been subject to the same kind of market reforms as those seen within other public utility sectors. These include the introduction of more competition and privatization. Within the EU, the guidelines for such reforms in the postal area were formulated in the Green Paper on postal services (EU, 1991).

Journal of NBICT, Vol. 1, 207–222.
doi: 10.13052/nbjict1902-097X.2018.011

From an institutional point of view, postal and telecom services have been closely related, as they have been part of the same public entity (the former PTTs). The first step in the telecom reform process was in many countries to separate postal and telecom services, as telecom was considered better suited to be provided on market-based conditions, and to avoid cross subsidization from telecom to postal services.

However, the point of departure for the two sectors is very different. While telecom in general is a profitable business, public subsidies have been necessary to ensure the provision of postal services. In addition, the basic service of letter distribution is challenged by digital alternatives.

In Denmark, the amount of letters has been reduced by 75% from 1998–2012 (WIK, 2012). Since then, a further decrease of 50% has taken place (Postnord, 2018), meaning that the number of letters has been reduced by more than 87.5% from 1998–2017. This has led to severe financial problems for the postal operator Postnord. At the same time, the requirements for ubiquitous service delivery have been relaxed and tariffs have increased. Private company customers find alternative solutions and a vicious circle with decreasing revenues and deteriorating services is initiated.

The main initiating driver behind this development has been the introduction of digital letters by public institutions. Since 2014, it has been mandatory for all Danish citizens to have a digital letterbox (e-box), where they receive electronic letters from Danish authorities and many other institutions including banks that use the e-box system. This has enabled public institutions as well as private companies to digitalize almost all their communications with private citizens and businesses. Elderly and disabled citizens can be exempted from this rule, and they can still receive letters by post. In 2014, 70% of the population was equipped with an electronic mailbox. This had increased to 90% in 2017. Within the age group 15–65 years, 97% of the citizens have a secure digital letterbox (Danish Agency for Digitisation, 2018).

Digitalization implies substantial savings, but it also creates problems. Many operations in society depend on a reliable ubiquitous postal service. Not all citizens are able to operate a computer, and there are still physical documents and others, which cannot be distributed by electronic mail.

The growth in e-commerce has led to an increasing number of parcel deliveries to private customers. This has contributed to the revenue of postal operators. So far, however, revenues generated by parcel delivery have not been sufficient to compensate for the losses in letter distribution, but it may be a contributing factor to make the maintenance of a physical communication infrastructure viable.

This paper will go deeper into these challenges. First there is a theory section on substitution. This is followed by a section on selected contributions to understanding the development in the postal area and the substitution of electronic communications for postal services. Then there is a section on the development in Danish use of electronic communication services, followed by a section on the impact of ICT on postal volumes and a section on the impact of ICT on the postal operators and finally a conclusion.

2 Substitution Effect

In the traditional economic theory of substitution (Varian, 2014), the substitution effect is related to the relative prices of goods and services that have comparable utilities to consumers. In the markets theorized by traditional neoclassical economics, goods and services are static, and it is only the relative prices that affect substitution. In dynamic markets where there is innovation in goods and services, innovations also affect substitution.

In the case of postal services versus Internet-based services, there is clearly an innovation factor at play. Internet-based services can substitute for postal services and deliver information and communication at a much faster pace and with new and additional facilities. It can obviously be argued that innovations in electronic communications are translated into lower prices of electronic communications as opposed to postal communications and that this is the basis for the substitution effect. However, the driver is clearly the innovations in electronic communications.

The degree of substitution thus depends on the relative prices as well as the extent to which comparable goods and services actually service the same needs and provide the same utility to the users. In the case of postal and telecom services, going back in time, telegraphy could to some extent substitute for postal services, and so could telephony. However, voice communication and written communication are not perfect substitutes for one another. They can even be seen as complements in the sense that they can boost one another: Both services enhance the contacts between distant communicating parties, and postal communication may increase the need for also talking together, just as voice communications and the agreements reached when talking may need to be supplemented with postal communication.

The same, to a large degree, applies when looking, for instance, at telecom and travelling. When Internet became a widespread media for communication, just as when telephony became popular, there was much enthusiasm around the possibilities for limiting the need for travelling when communications

could take place electronically. However, the overall picture is that electronic communications and travelling boost one another although there also may be a certain degree of substitution.

Similar discussions have long been on the agenda in media research (e.g. Kaye and Johnson, 2003). Does radio substitute for newspapers, and how about television and radio and newspapers? And, how is it with Internet-based communications and the one-way mass media? For many years, the general assumptions and findings from media research have been that, although there is some degree of substitution, the most salient picture is that the various media complement each other and that they 'layer' one upon another. In the very long run, this may not hold true. Internet-based communications will eventually substitute for traditional radio and television. But it may not substitute for one-way communications as such. Streaming media, voice as well as video, have become increasingly popular during the past few years.

Similar issues have affected the relationships between postal and Internet-based services. When the first forms of communication services on the Internet appeared, primarily e-mail and FTP, the prediction was that this would substitute for postal services. However, for a number of years, this effect could hardly been seen in statistics. But during the past few years, the substitution effect has grown increasingly stronger – and, as will be seen in this paper, the substitution effect has been extremely strong in Denmark.

The question is whether there will be perfect substitution leading to total replacement and not only displacement. The paper will examine this with respect to text communications, where postal services in terms of letters and postcards can be substituted by Internet-based communications. Concerning other postal services such as advertisements and parcel services, the picture is different. Paper advertisements play a central role in Danish postal services and have remained an important type of postal service because it is a very effective form of direct mass marketing. Parcel services have increased dramatically, the reason being e-commerce. In this case, there is a strong complementation effect between postal services and Internet-based communication. In this paper, however, we will primarily focus on the examination of letters as postal services and the substitution between paper-based letters handled by postal service providers and Internet-based written communications.

3 Brief Overview of Research Since the 1990s

Substitutions between postal and telecommunications services have not often been approached in literature. There are masses of research reports and articles

on the developments of telecommunication services, and there is another large number of writings on the developments of the markets for postal services. However, only little has been written on the interrelationship between these two areas of communications. This applies, even more so, when dealing with the consequences for employment in the postal sector.

The issue of substitution between postal and telecom services were first studied in the 1990s when data services became more widespread. We will, therefore, take our point of departure in some of the publications from this period first. No elaborated methodology stands out. Some of the studies (especially Iversen and Pedersen, 1995) introduce a broader framework for analysis. However, studies mainly consist of reviews of previous studies and of correlations of statistical data regarding mail volumes and penetration of electronic means of communication.

There appears to be no general consensus on the substitutional effects of telecommunications on postal services. There has been an agreement, though, that, *ceteris paribus*, the deployment of electronic services will affect the volumes of postal services in a downward direction. But the total demand for communication services has been subject to such differences in estimation that one study (Price Waterhouse, 1992) forecasted a decline in mail volumes of 15–20% on a 5–10 years horizon, while another study (Clot, 1991) estimated that there would be an increase of 4–5% per year in mail volumes during the 1990s.

The differences in estimations were partly due to variations in evaluations of, e.g., the developments in GDP (Nikili, 1997, included this factor), substitution vs. complementarity, the role of communications in businesses and society at large, where Iversen and Pedersen (1992) emphasized the changing needs for communication in the era of information societies, and the speed of implementation of electronic technologies.

The importance of the development of a common telecommunications infrastructure including network facilities, terminals and common standards for communication was emphasized. Lack of common standards and interoperability of e-mail systems were in the first phases a major reason for the prospering of telefax at the expense of the more cost-efficient e-mail. The Internet, however, developed as the long expected common infrastructure for a wide range of electronic services, and use of e-mail and other electronic services grew rapidly in the following years.

There seems to be a general agreement that the main factors affecting the rate of substitution was the penetration of electronic services while price-elasticities were moderate. However, the price-differential between e-mail

and other types of communication (including postal services) was so large that costs play a major role in the choice of communication channels.

When turning to the impacts on employment, it was, in reality, only the studies of Clot (1991), Henten and Skouby (1992) and Iversen and Pedersen (1992) that addressed this question – and they did so in primarily in a qualitative fashion and only tentatively in a quantitative way. The relations between mail volumes and employment figures were not necessarily 1:1, and the effects of telecommunications had to be mediated by other change drivers, such as liberalizations creating a competitive market and reorganizations of the postal operators.

The complicated interrelationships between these different change drivers were probably the main reason for the primarily qualitative character of analyses of the effects of telecommunications on the employment in the postal sector. The studies that approached the question primarily focus on strategic perspectives for operators and employees dealing with the possible take-up of hybrid or end-to-end electronic services by postal operators.

For many years, the EU has been following the development of the postal sector. Different consultancy companies have acquired the consultancy contracts on elaborating reports on the 'Main developments in the postal sector'. Copenhagen Economics had the contract regarding the years 2008–2010 (Copenhagen Economics, 2010), WIK had it for 2010–2013 (WIK, 13) and Copenhagen Economics once again for 2013–2016 (Copenhagen Economics, 2016). For the last few years, Springer International Publishing has also been publishing anthologies on postal developments. In 2016, Crew and Brennan (2016) edited a volume on 'The future of the postal sector in a digital world' and Crew et al. (2017) edited a volume on 'The changing postal and delivery sector'.

The consultancy reports examine 'mail market developments', 'regulatory developments', 'developments of competition', 'universal service obligation', 'postal labour market', 'technology developments', etc. (Copenhagen Economics, 2010). In the books published by Springer, various issues are also dealt with, however focusing to a large extent on regulatory and economic matters. But there are also papers discussing explicitly the substitution of postal for telecommunication services.

In a paper by Jaag et al. (2016) in one of the Springer books, 'Postal strategies in a digital age' are discussed. This is basically a study of country cases examining the various strategies that postal operators are deploying based on the different market and regulatory conditions in the various countries. In line with many other reports, the paper documents that letter mail has gone down in all the countries surveyed and that parcel mail has generally

gone up – however at different speeds. It also documents that the different countries rely to a very different degree on the range of various services that postal operators provide. In Italy and Japan letter mail only constituted respectively 12 and 11% at the beginning of 2010 decennium, while in Spain and the Netherlands, letter mail constituted 91 and 85%. Parcels and express are getting more and more important in a number of countries, especially Norway (59%) and Australia (50%). Another large service category is financial services. In Japan this constituted 82% and in Italy is was 85%. This shows that although there are some common trends (the declining letter market and the growing parcel market), the conditions in the various countries are vastly different, which means that the strategies applied also vary.

In a paper by Parcu and Silvestri (2017), 'Lessons from the postal sector to telecommunications and vice versa' are examined. This paper also reports on the declining letter market and the growing parcel market. However, the main discussion in the paper is actually on how Internet has affected the postal and telecommunications sectors respectively. The paper sees both sectors as being affected by the advent and growth of Internet. Both sectors have witnessed two main change drivers, the paper argues: Deregulation and Internet. However, while deregulation of telecommunications came before the vast growth of Internet, the deregulation of the postal sector came after the omnipresence of Internet. According to Parcu and Silvestri (2017), this provides a background for exchange of experiences and learning between the postal and telecommunication sectors: How to deal with the implications of Internet? For the postal services as such, the main business models and strategies for postal operators are what Parcu and Silvestri (2017) call postal-postal, postal-financial and postal-hybrid. Postal-postal focuses entirely on postal services, postal-financial has emphasis on financial services, and postal-hybrid includes both service areas. Once again, this shows that the strategies that postal operators follow differ to a large extent, depending on the specific circumstances in the different countries. Those focusing only or primarily on traditional postal services suffer the most from the substitution of letter mail.

4 Development in Danish Use of Electronic Communication Services

Denmark has for many years been one of the leading countries with regard to the use of electronic communication services. Denmark ranks as number 1 on the EU Digital Economy and Society Index (DESI) (Figure 1) and is also on the top the list with regard to the use of the Internet and Integration of Digital Technology (a parameter for business use of ICT).

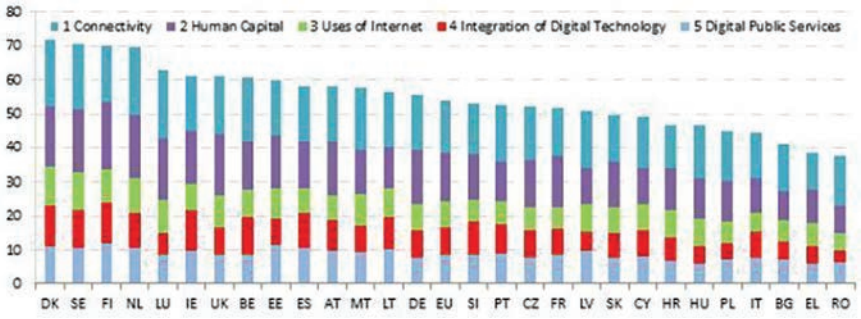

Figure 1 Digital Economy and Society Index (DESI) 2018 ranking.

Source: EU (2018)

From a postal sector perspective, digital public service can be expected to be the most important parameter. According to DESI, Denmark is in this area lagging slightly behind Estonia, Netherlands and Finland. Without going into detail with this, we will claim that Denmark is at the forefront with regard to substitution of postal letters from the government for electronic communication services. The trend in postal services presented in the following section points in this direction.

The Danish government introduced a digital signature enabling digital collaboration between public authorities and citizens back in 2001 (Figure 2).

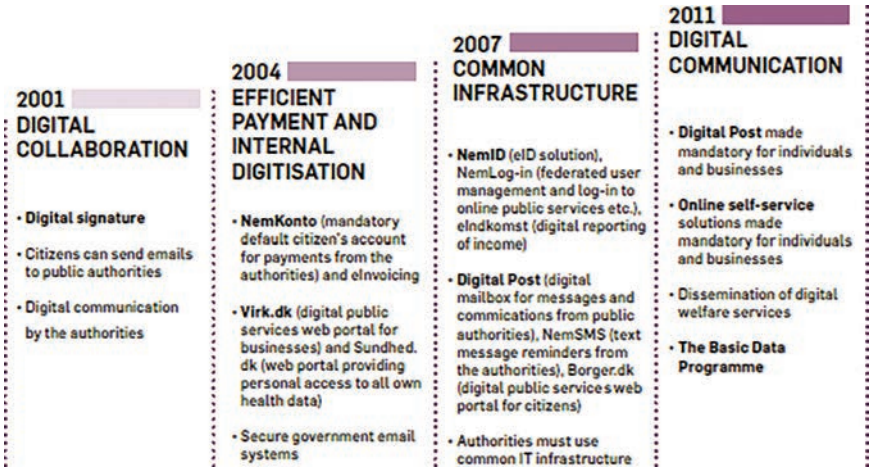

Figure 2 15 Years of Digital Strategies.

Source: Agency for Digitisation (2016)

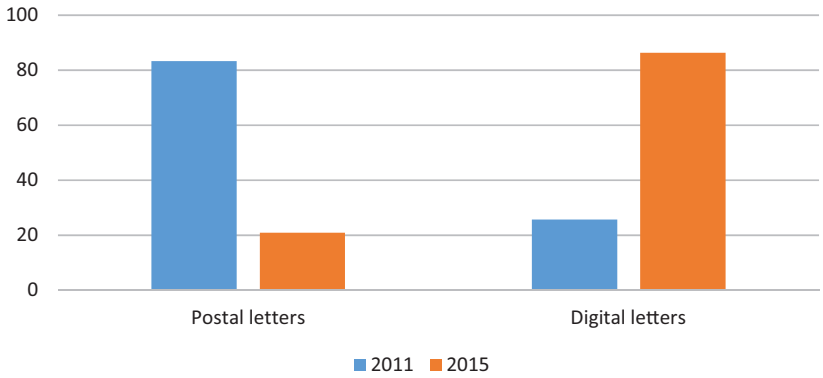

Figure 3 Postal and digital letters send by public authorities 2011–2015 (mil.).*

* Only letters that can be digitalized are included
Source: Spitze & Co (2016)

In 2004 the concept of a NemKonto was introduced. It became mandatory for all citizens to establish a special bank account, which is used for payments from public authorities using e-Invoicing. Moreover e-Invoicing became mandatory for all companies providing goods and services to public institutions. These initiatives promoted the use of purely electronic communication in relation to payment services among public institutions, citizens as well as private companies. In 2007 a new system for digital signatures was introduced, NemID. This was combined with a digital mailbox, which only can be accessed by use of NemID, and it became possible to receive information from public authorities, public utilities, banks, insurance companies etc. in this mailbox.

The major blow to paper based communication came, when it in 2011 become mandatory for all citizens to have a digital mailbox, where they receive all information from public authorities. It is still possible for elderly people or others lacking skills in e-literacy to be exempted. In 2018, 90% of the population has acquired a digital mailbox. Most of the remaining 10% are elderly people, and 97% of the population below 65 are connected to the system. This has reduced the number of physical letters send by public authorities by 69% in four years (Figure 3).

5 Impact of ICT on Postal Service Volumes

The potential for electronic substitution of postal services is largest in the most advanced group of countries, but substitution is promoted both by the availability of electronic services and by poor quality of postal services. The countries in the most advanced group are also the countries offering the best

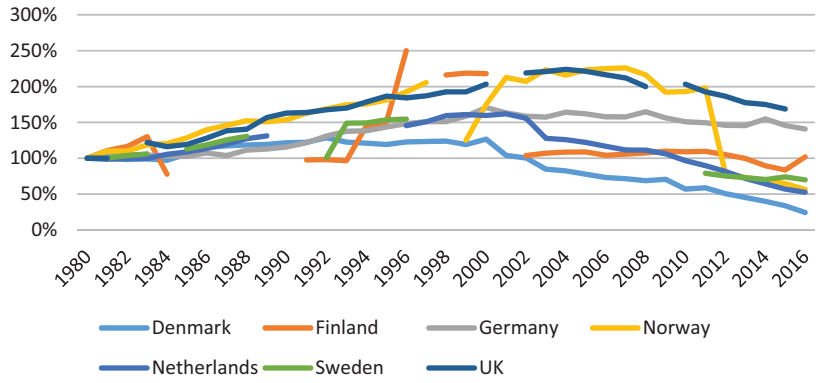

Figure 4 Number of letter-post items, domestic service, Selected countries (1980=100).

Source: Calculated on basis of data from Universal Postal Union Database

postal services, while countries in the least advanced group are the countries having the lowest quality of postal services. Therefore, electronic substitution in the longer term can be expected to be highest in the least advanced group of countries if the level of postal services remains unchanged while electronic services develops.

The developments in the markets for postal services in Western countries are in short characterized by a decline in postal letters and an increase in parcels. It follows from (Figure 4) that until the turn of the millennium most countries had an increase in the volume of letters. However, the substitution of postal letters started much earlier, as both telefax and e-mail took off in the late 1980s. In 1997, only 24% received the banking statements by postal mail (Plum, 1997). This reflects that economic growth has been an important driver for the demand for postal services. Even after the subsequent decline, the volume of letters is still highest in the most advanced high-income countries level of postal services (WIK, 2013).

Since year 2000, the volume of letters has declined in all countries, but in no other countries has the decline been as dramatic as in Denmark. Here the letter volume in 2016 is 40% of the volume in 2011 and less than 20% of the volume in year 2000.

6 ICT Impact on Postal Operators

The decline in letters and the subsequent decline in revenues is a challenge for all postal operators. Moreover, postal markets in many countries have

been through a liberalisation process, and competition has been introduced especially in parcel markets.

Different strategies have been suggested to meet these challenges: Increases in tariffs, cost cutting for instance through automation, focus on other existing services such as money transfer and other financial services, introduction of new services, e.g. hybrid mail. Some countries such as Australia, New Zealand, Switzerland and Italia have been successful in keeping postal operations profitable through delivery of other services (primarily financial services). In other countries, postal operators have not been allowed to expand its businesses. Cutting in costs, increase in tariffs, and lowering of service levels have been the only options available.

Postal services in Denmark were first established through a regulation issued under Christian IV in 1624. In 1711 postal activities were incorporated as a part of the public administration. In Denmark, the financial services offered by the postal operator were divested already in 1988, and from 2001 financial services can no more be carried out at postal offices.

In order to prepare for a later privatisation, Post Danmark was created as a public owned shareholder company in 1995. In 2009, Post Danmark was merged with the postal operator in Sweden under the name PostNord owned 60% by the Swedish government and 40% by the Danish government.

Post Danmark is engaged in other activities than letter distribution. They have a dominant position at the expanding market for distribution of parcels and they provide logistic services connected to traditional postal services. Moreover, they have a 50% market share in E-box – the dominant service provider for hosting secure mails from the public institutions. Still, letter distribution is the major source of income and the decline in physical letters has had a major impact on the income and the annual result (Table 1). Until 2011, Post Danmark was a profitable business. Up to 2008 the surplus was 600–800 million DKK.

It follows that Post Danmark has been unable to reduce costs enough to avoid major financial losses. In 2016, Post Danmark employed 10,000 people compared to 20,000 ten years earlier, and they are expected to reduce the labour

Table 1 Post Danmark Financial results (mill. DKK 2012–2016)

	2012	2014	2016
Revenue	8620	7571	6641
Current costs	8480	8014	7198
EBIT	−207	−301	−1178
Profit	−67	−183	−1372

Source: Post Danmark Annual Report, 2016

force with another 3,000. The problem is that many employees are employed as civil servants, who are eligible to substantial financial compensations, if they are fired. EU has therefore, allowed the Danish government to pay a subsidy to Post Danmark to avoid bankruptcy.

Post Danmark has also taken other initiatives to reduce costs. This includes reductions in the postal infrastructure and quality of service. There are now only two full service postal offices left in Denmark. The rest have either been replaced by unmanned boxes or outsourced to retail shops only providing limited services.

The delivery time for letters has been extended. Until 1968, there would be up to 3 rounds of delivery per day, and until 1979, there were 2 rounds. Now it can take up to five days (excluding weekends) to receive a letter. This creates problems for the small minority, which is unable to receive digital letters, and adds to the costs in hospitals, general practitioners etc., who cannot communicate efficiently with their patients. Some private companies and even public institutions now rely on private distributors, when communicating with their customers and private citizens. This introduces a viscous circle of deteriorating service levels and falling revenues for Post Danmark.

The postal policy objectives in Denmark have since 1995 been to (Min. of Transport, 2003):

- Ensure availability of universal postal services
- Promote competition through liberalization of the postal market

A third objective is to enable a privatization of the postal operator. This implies that the objective of liberalization has to be balanced against the opportunities for maintaining an economic sustainable postal operator. The telecom sector has been subject to similar considerations during liberalization and privatization. However, here the point of departure has been quite different. The key postal service has been letter distribution, while the key telecom service was fixed telephony. Both services belong to sunset industries with a limited growth potential and both services are subject to a universal service obligation. However, incumbent telecom operators have a profitable business, while postal services often have depended on public subsidies. Apart from service provision in some remote areas, telecom is a profitable business and the sustainability of the incumbent operator is usually not been an issue.

Substitution is also an issue within the telecom sector. PSTN services are being replaced by Internet based and mobile services. However, in this case, substation is taking place within the same sector, while postal services are being substituted by telecom services.

7 Conclusion

For a good number of years after the introduction of electronic data services on the broader market, postal communications kept on increasing – although one should think that there would be a strong substitution effect. In the beginning, however, it seems that the postal and electronic forms of communications supplemented each other. But since app. 2000, a substitution effect has been witnessed in all countries. Denmark is a showcase in this context. The amount of letters has decreased steeply. An important reason is that there has been a concerted move in Denmark on the part of public authorities to communicate with citizens and businesses electronically. In some countries, electronic services to citizens and businesses are offered as an option, but in Denmark this is the rule, however with the possibility for exemptions if receivers apply for it. This has created a situation, where postal services in Denmark have seen a sharp decline resulting in services at a level that has not been seen since postal services were inaugurated in the 17th century. Postal services in Denmark are, to a large extent, a parcel service and a service for the distribution of commercial material.

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He has participated in many EU funded research projects in the telematics area. He has also conducted a large number of consultancies for national and international organisations such as ITU, UNCTAD, the World Bank and the National Telecom Agencies in Denmark, Norway and Sweden.

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